

# Saving Money

**SUBMITTED BY:** Nina Hoe, University of Pennsylvania

**SUBJECT(S):** Computation

**GRADE LEVEL(S):** 9, 10, 11, 12

## ≡ OVERVIEW:

Students begin this lesson with a whole class discussion on the importance and need for saving in general. Students will learn about planning to save and regular saving. In smaller groups, students will first answer questions based on scenarios, and then use the information to create their own savings plan. The class will then come back together for a whole group discussion on saving specifically for retirement and are introduced to IRAs and 401Ks.

## ≡ RELATED ARTICLES:

- [“Your Money: 3 Questions for CNote’s Yuliya Tarasava”](#)
- [“Why It Pays to Save: Knowing the Time Value of Money”](#)
- [“Talking Money: Students Reflect on a Year of Spending, Valuing and Socking It Away for College”](#)
- [“Educator Toolkit: Financial Literacy”](#)
- [“College Decisions Sometimes Require Sacrifice”](#)
- [“Blogger Zina Kumok: Saving Money Helped Me Prepare for My Future and Even Find Love”](#)
- [“A Trip to the Bank, Lollipops and World Savings Day”](#)

**Objectives/Purpose:** Students will calculate savings totals. They will be able to write equations that model a savings plan and use the equations to determine how long it will take to save for certain things, and how much they will need to save in specific intervals.

**Standards:**

*Wharton Global Youth Program:*

- Mathematical Foundations
- Number Relationships
- Patterns, Functions, and Algebra
- Problem Solving

*Common Core:*

A-SSE.1. Interpret expressions that represent a quantity in terms of its context

A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .

F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

**Knowledge@Wharton Articles:**

[“An End to the Golden Years: Increasing Longevity Changes the Work-leisure Equation”](#)

[“How Much Money Will You Need for Retirement More Than You Think”](#)

[“Not So Golden: Employees — and Employers — Feel the Pinch from Shortfalls in Retirement”](#)

[“Funding / How Well Do 401k Plans Work, and Who Benefits most from them”](#)

**Other Resources/Materials:**

## Calculators

### Activity:

#### Class Discussion:

1. Why is it important to save money?
2. What types of things would you need to save money for?
3. If you were saving for something specific, how would you set up a plan for yourself to save? What factors would you consider? (**How much money you ultimately need and how long you have to save for it.**)

Have students work in small groups and write in complete sentences.

### Activity:

#### Student Worksheet

1. For the past few months, you have been saving \$15 each week.
  1. Assuming that you have not been earning any interest, if you have \$525 in your account today, for how many weeks have you been saving? **(15)**
  2. Four weeks ago, how much had you saved? **(15 - 4 = 11 weeks of saving. 11 x \$15 = \$165)**
  3. Nine weeks ago, how much had you saved? **(15 - 9 = 6 weeks of saving. 6 x \$15 = \$90)**
  4. Complete the table below to track how much money you have saved over the past few weeks.

Time since you started saving money	Amount saved
weeks	dollars
0	<b>\$0</b>
1	<b>\$15</b>
2	<b>\$30</b>

3	<b>\$45</b>
4	<b>\$60</b>
8	<b>\$120</b>
12	<b>\$180</b>
24	<b>\$360</b>
30	<b>\$450</b>

In the space below, graph the savings points recorded in #1 part d. Put time on the x-axis and the amount saved on the y axis. Be sure to label the graph and axes. Allow space on the x-axis for up to 52 weeks.

[Before you graph, make sure to identify:

Variable quantity: **(amount of money saved)**

Lower Bounds: **(0 weeks, \$0)**

Upper Bounds: **(52 weeks, approx \$800?)**

Intervals: **(5 weeks, \$50)]**

6. Draw a line to connect the points you have graphed.
7. In a sentence, describe what happens to your savings throughout this time period. **(It increases at a constant rate of \$15 per week)**
8. Extend the line through 52 weeks. Use this to estimate how much money you will have saved after a year. **(Answers will vary.)**
9. Write an equation for your savings plan. Let  $y$  = the amount of money saved and  $x$  = the time since you started saving. **( $y = 15x$ )**
10. Use this equation to calculate exactly how much you would save after a year. **( $y = 15 \times 52 = \$780$ )**
11. What is your y-intercept/starting point? **(\$0)**
12. If you had started with \$90 before you started saving, how would that affect your totals each week? **(Each week you would have \$90 more than in the**

*previous situation.)*

13. Write an equation to reflect this scenario. ( $y = 15x + 90$ )

[Remember that a line can be represented by the equation  $y = mx + b$

To adapt this to a savings situation, let:

$y$  = total amount saved

$x$  = time (the number of intervals at which money was put into savings in weeks, months, years, etc)

$m$  = the amount of money put into savings at each interval  $x$

$b$  = the starting point (how much money you started out with).]

2. You want to buy a car that costs \$4,220. Currently, you have \$500. On top of this, if you put away \$120 each month in a savings account, how long will it take you to have enough money to buy the car?

1. Write an equation to model this scenario. ( $y = 120x + 500$  or  $4,220 = 120x + 500$ )

2. Graph this line in the space below.

[Before you graph, make sure to identify:

Variable quantity: **amount of money saved**

Lower Bounds: **(0 months, \$500)**

Upper Bounds: **(? months, \$4,220)**

Intervals: **(5 months, \$240)]**

3. Use the line to estimate how much you will have in savings after 8 months.

**(Answers will vary.)**

4. Use your equation from part a to calculate the exact number of months it will take you to save enough money to buy this car. **(31)**

3. You want to buy a new computer for the start of the school year, which is 4 months (17 weeks away). The computer costs \$680. If you are planning to put money away each week, how much will you need to save each week in order to meet your goal of \$680 in 17 weeks? (**Here,  $x$  = the number amount of money put away each week.  $680 = 17x$ ;  $x = 680/17 = \$40$  per week**)

Investigation: Answer the following questions based on your own life.

4. Choose something that you might want to save for in the next year. (**Answers will vary.**)
  1. Estimate the cost:
  2. Do you have any current savings to put towards this?
  3. You have a year to save for this – do you want to save each week or each month?
  4. Write an equation for this scenario. Make sure you define each component of the equation ( $y$ ,  $x$ ,  $m$ ,  $b$ ) and plug in the values that you already have.
  5. How much will you need to save at each interval to meet your goal? Which variable is this represented by?
  6. In the space below, graph your savings scenario. Don't forget to account for your current savings in terms of your intercept.

[Before you graph, make sure to identify:

Variable quantity:

Lower Bounds:

Upper Bounds:

Intervals: \_\_\_\_\_ ]

5. Choose something that you might want to save for in the long term. (**Answers will vary.**)
  1. Estimate the cost:
  2. How much money seems reasonable for you to save each month or week?
  3. Do you have any current savings to put towards this?
  4. Write an equation for this scenario. Make sure you define each component of the equation ( $y$ ,  $x$ ,  $m$ ,  $b$ ) and plug in the values that you already have.
  5. Based on your answers to a – c, how long will it take you to save for this?

6. In the space below, graph your savings scenario. Don't forget to account for your current savings in terms of your intercept.

[Before you graph, make sure to identify:

Variable quantity:

Lower Bounds:

Upper Bounds:

Intervals: ]

### Whole Class Discussion/ Extension:

In the earlier discussion, you identified some things that people typically save for – large purchase items, etc. Another thing, other than items, that people save for is retirement.

1. Why is it important to save for retirement?
2. How much money do you think a person or couple needs to save for retirement?
3. For how many years do you plan (or need to plan) to be in retirement?
4. What are the ways in which people save for retirement?

**\*\*Note: This topic is covered in further detail in a later lesson specifically focused on retirement.**

Read the Knowledge@Wharton Article: [“How Much Money Will You Need for Retirement More Than You Think”](#)

There are two types of accounts that people typically use for retirement accounts as opposed to a regular savings account. They are

An **IRA**:

*“IRA stands for Individual Retirement Account, and refers to money that you put away for retirement, on which you get a tax break. It's different from a 401K in part because you only get to put money in a 401K if your employer offers you this option. I'm putting money in my IRA, so that I can have enough money to live on when I retire.”*

And a 401K

*“A 401K is a pension provided by your employer, on which you get a tax break. I put lots of money into my 401K. But when the stock market lost value last year, my 401K got a lot smaller.”*

Note: [Pension](#)

*“A pension is money that will be paid to a person when they retire. When I retire, I’ll live off money from my pension.”*

In later lessons, we will discuss what makes these accounts different from regular savings, and even regular investment accounts.

5. A person works from the time he/she graduates from college (age 22) until the age of retirement (age 65). If he/she saves \$100 each month out of his/her earnings during the course of the working career, how much will this person have saved of his/her own money by the age of 65? (Disregard interest.) ***(65 – 22 = 43 years of working; \$100 x 12 months = \$1,200 saved per year; 43 years x \$1,200 per year = \$51,600***
6. In the Knowledge@Wharton article *How Much Money Will You Need for Retirement More Than You Think*, they suggest that you should plan for 100% of your annual salary for your retirement – meaning that if you make \$100,000 while you are working, you should plan to have \$100,000 for every year you spend in retirement.
  1. In this scenario, if you plan to live 30 years in retirement (ages 65 – 95), how much money will you need for that time? ***(30 years x \$100,000 = \$3,000,000)***
  2. If you work for 43 years, putting money away each month, how much would you need to save each month to have \$100,000 for each year of your 30-year retirement? (Disregard interest.) ***(43 years = 516 months; 3,000,000 = 516x; x = \$5,813.95!!... Explain that obviously this is an incredibly significant amount of money and compounding interest and investments make it so that you have theoretically put in less money but it grows over time.)***

### Tying It All Together:

1. Have students present their individual savings plans to the class.
2. Discuss saving for retirement further.

### What Worked and What I Would Do Differently:

